FISHPOND MANAGEMENT
CODE 399

Natural Resources Conservation Service
Conservation Practice Standard

Definition

Developing or improving impounded water to produce fish for domestic use or recreation.

Purpose

To improve or maintain fish production and fishery use by making a favorable water habitat; supplementing natural food supplies; and reducing competition from unwated plants and animals.

Where Applicable

In ponds, lakes, and reservoirs where a crop of fish is wanted.

Planning Considerations

A desirable fishery can be sustained in properly designed and managed ponds. The one outstanding reason for poor fish production in ponds is lack of adequate management. Even when ponds are built to specifications and properly stocked, continued management and maintenance are essential to sustaining desirable yields. Potential fishpond builders should be apprised of the management commitment necessary to achieve their goals. Recommend reading "Wisconsin Farm Fish Ponds" to all potential pond builders.

In addition to the criteria described in the standard for Ponds (378), a determination must be made at the site whether the pond will be suitable for cold or warm water fish. Trout ponds should maintain a normal water temperature range of 10-18 C (50-65 F) with a surface water temperature that rarely exceeds 22 C (72 F).

Cold-water fishponds require a minimum flow from springs and/or ground water seepage of 76 l. (20 gal.) per minute for each 0.04 ha (0.1 ac.) surface area. Determine spring flows using any of the following methods: (1) timing the filling of a container of known volume; (2) use a 90 degree triangular notched weir to determine hydraulic head, then use table in "Wisconsin Farm Fish Ponds" to determine discharge; or (3) use a flow-meter.

SPECIFICATIONS

A. Watershed Protection and Adjacent Habitat Development

The quality of pond water and the aquatic life it supports is greatly influenced by the surrounding land use and drainage area. The drainage area must be protected against erosion to the extent that expected normal sedimentation will not shorten the planned effective life of the structure. The water in ponds shall be protected from contamination from barnyards, septic tanks or other sources.

Ponds oftentimes influence the abundance and diversity of wildlife on adjacent land. Therefore, ponds and adjacent land should be planned and managed as a component of a resource management system that considers overall environmental impacts as well as land use objectives.

B. Livestock Exclusion

Livestock shall be excluded from the pond unless a livestock watering facility is developed to provide the animals with controlled access to the pond.

C. Management for Fish

1. Species Selection and Stocking Rates

a. Cold Water Ponds.

Normal water temperature is cooler than 18 C (65 F) and surface water temperature rarely exceed 22 C (72 F). Rainbow trout are most suitable. Brook trout are suitable but often have a lower survival rate than rainbow. Brown trout are suitable and are tolerant to higher temperatures than either rainbow or brook but are more difficult to catch.

Table 1 provides guidance in determining initial stocking rates for ponds of medium fertility. Use lower stocking rates for less fertile waters and higher rates for fertile waters. A simple test for alkalinity will give an indication of fertility. Consider the medium fertility range to be 40-120 mg/l of CaCO3 alkalinity. Trout normally do not reproduce in ponds so restocking should be planned at 2-3 year intervals, depending upon growth and harvest rates. If adult trout are present, do not restock with small fingerlings.

Commercial fish production, hatcheries, or raceways require more detailed analysis to determine stocking rates and a fisheries biologist should be consulted.

b. Warm Water Ponds.

Historically, largemouth bass and bluegill have been the most popular fish to stock in warm water ponds. In light of management problems, bluegills should be stocked only when population controls are planned. Channel catfish may be stocked. Hybrid sunfish are being used with success and are available commercially. Under more intensive management other warm water species, including yellow perch and redear sunfish, may be stocked. Northern pike, muskellunge, walleye, crappies, and bullhead are not recommended. Forage fish such as golden shiners or fathead minnows when stocked with largemouth bass or channel catfish will result in earlier development of catchable-size fish.

Note: It is illegal to stock grass carp or white Amur in Wisconsin.

Table 1 provides guidance in determining initial stocking rates according to pond size. Largemouth bass and bluegill, if properly managed, should not require restocking since reproduction will replenish harvest. Channel catfish may successfully reproduce if provided hollow nesting sites such as nail kegs, drain tiles, milk cans, or hollow logs. Hybrid sunfish require restocking but do not recommend restocking small fingerlings if adult bass or channel catfish are present.

2. Supplemental Feeding

Natural food supplies in the pond will sustain the fishery in ponds tocked at the rates shown in Table 1. With intensive management and supplemental feeding, higher fish populations and harvestable yields can be produced. Feed should be provided at the same time and from the same place every day during the growing season. The optimum growing season for trout can be considered to be the period when water temperatures range from 10-18 C (50-65 F) while for channel catfish and sunfish the optimum growing season can be considered that period when water temperatures are above 15 C (60 F). Hybrid sunfish (bluegill x green sunfish) respond well to supplemental feeding. Offer only the amount of food that can be consumed in 15 minutes. Excess food will be harmful to water quality.

Table 1
Some Initial Fish Stocking Recommendations [1]

a. Cold Water Ponds			
Species	Size	No./ha.	No./ac.
Alt (1) Trout	5-10 cm. (2-4 in.)	250-425	100-175
Alt (2)	12-15 cm. (5-6 in.)	225-370	90-150
Alt (3)	22-25 cm. (9-10 in.)	200-320	80-130
b. Warm Water Ponds Less than 0.3 ha. (0.75 ac.)			
Species		No./ha.	No./ac/
Alt (1) Largemouth Bass Bluegill x Green Sunfish Hybrid		185 5,000	75 2,000
Alt (2) Largemouth Bass **plus** Golden Shiners **or** Fathead Minnows		250 1,000	100 400
Alt (3) Channel Catfish **plus** Golden Shiners or Fathead Minnows		500 1,000	200 400
c. Warm Water Ponds larger than 0.3 ha. (0.75 ac.)			
Species		No./ha.	No./ac.
Alt (1) Largemouth Bass Bluegill Channel Catfish		250 1,250 250	100 500 100
Alt (2) Largemouth Bass Bluegill x Green Sunfish Hybrid		250 7,500	100 3,000
Alt (3) Channel Catfish **plus** Golden Shiners **or** Fathead Minnows		500 1,000	200 400

[1] This table is to serve as a guide illustrating some stocking recommendations that have been managed successfully in the Midwest. Other combinations and rates may be used, depending upon the owner's objectives and site suitability.

3. Fish Population Control

Maintenance of a "balanced" fish population requires careful management. Managing the harvest is most important in warm water ponds stocked with several species of fish. Aquatic plant control described in another section is a prerequisite to fish population control. Records must be kept and restocking planned for species that will not reproduce in the pond.

a. Cold Water Ponds.

In trout ponds harvest 60 to 125 fish/ha./yr. (25 to 50 fish/ac./yr.) depending upon growth rate and planned restocking. Records must be kept of fish removed. Natural mortality should be accounted for in that 20 to 50 percent of the fish may die annually after reaching 20 cm (8 in.) in length.

b. Warm Water Ponds.

Maintaining a "balanced" population of largemouth bass and bluegill is difficult but possible. Overharvest of bass is a leading cause of stunted panfish populations. Bass must not be fished until they have had a successful spawn, generally occurring the second or third year after stocking. Then, in fertile ponds, harvest no more than 45 kg/ha./yr. (40 lbs./ac./yr.) of bass; in less fertile ponds no more than 28 kg/ac./yr. (25 lbs./ac./yr.).

Manage the bass harvest to sustain a "balanced" population consisting of individuals in all year classes. It takes 1.8 or 2.2 kg (4 or 5 lbs) of forage fish (bluegills) to produce 0.45 kg (1 lb) of bass. A "balanced" bass population will serve as a check on the panfish or forage fish.

Bluegill and channel catfish may be harvested as soon as they are considered big enough to eat. A good pond should yield 500-750 fish/ha./yr. (200-300 fish/ac./ yr.). Channel catfish and hybrid sunfish will require periodic restocking, depending upon the rate of harvest.

In some ponds, particularly neglected ponds, total fish erradication and restocking may be necessary. Completely draining the pond for two weeks is recommended. Fish toxicants rotenone and antimycin are approved for use in Wisconsin, but a permit for their use is required for ponds not licensed as a private fish hatchery.

4. Water Quality Management

The following practices may be useful in certain situations. Consult with the Service biologist before making recommendations:

a. Aeration. Commercial aerators or circulators may be needed to prevent fishkill resulting from winter or summer stagnation. Aerators or circulators may allow ponds to support fish at shallower depths than those described in the specifications for Ponds (378).

b. Liming. Lime may be used to clear darkly colored water or turbid water caused by suspended soil particles. Liming may increase productivity in some areas.

c. Fertilization. Fertilization of waters in Wisconsin is generally not recommended.

5. Aquatic Plant Control

Aquatic plant controls are often needed even in properly designed and constructed ponds. Chemical controls are quite short-lived, sometimes requiring more than one treatment per year. Control recommendations are difficult to generalize, but one generalization is nearly always appropriate. Attack the cause of the problems before or concurrent with pond treatments! In Wisconsin, highly fertile water is a common cause of luxurious aquatic plant growths. An all-out effort should be made to prevent nutrient sources such as runoff from barn lots, agricultural fields, heavily fertilized lawns, and underground sources such as malfunctioning septic systems from entering the pond. The following techniques may be useful in treating nuisance aquatic plant growths:

a. Mechanical Removal. Physical removal can be accomplished by hand-pulling and raking or with commercial weed cutters and harvesters. Hand-pulling and raking can be effective in small ponds or spot treatments on such areas as swimming beaches. Commercial weed cutters and harvesters are usually too expensive for use in ponds. Mechanical removal allows for immediate use of the harvested area, and plants removed from the water are not available to deplete dissolved oxygen. Filamentous algae and macrophytes can be removed mechanically.

b. Habitat Manipulation

(1) Floating 203 micron (8 mil) black plastic on the pond surface for 4 weeks has proven successful in controlling pondweeds (Potamogeton spp.), coontail and water milfoil. However, this technique has failed to control Chara and emergent macrophytes.

Shading with dyes is still considered experimental and not recommended.

(2) Dredging. Properly designed and constructed ponds will not have shallow areas requiring dredging. However, as a renovation technique, dredging shallow water areas to a depth of 2 m (6 ft) in cold water ponds and 4.3 m (14 ft) deep in warm water ponds will minimize rooted macrophytes. Sloping shorelines on a grade of 2:1 will minimize suitable habitat for rooted macrophytes.

(3) Sand and Gravel Blanketing. To reduce rooted aquatics in small ponds or isolated areas such as swimming beaches, perforated black plastic blanketed with sand and gravel has proven somewhat effective. The minimum thickness plastic recommended is 203 microns (8 mil). gravel provides a less desirable substrate for plants and should be used in place of sand, where possible.

(4) Overwinter Drawdown. Overwinter drawdown exposes the plants to freezing and desiccation. Table 2 lists the influence of overwinter drawdown on some common aquatic plants. Winter fishkill may occur if drawdown exceeds the recommended minimum design water depths for warm water ponds (Standard and Specification 378, Pond).

d. Chemical Control

(1) Legal Requirements for Use. Section 144.025 of the Wis. Stats. requires a permit from the Wisconsin Department of Natural Resources (WDNR) before any herbicides can be added to waters of the state which includes private ponds.

No exemptions apply to this requirement except when a pond is already licensed as a private fish hatchery under Section 29.52 of the Wisconsin

Statutes. NR 107 Administrative Code states the rules and regulations required of the pond owner when chemical control is contemplated.

Under U.S. EPA regulations (FIFRA) for pesticides, no aquatic herbicides and algacides are presently classified as "restricted Use Pesticides". Therefore, a person using such pesticides is not required to be licensed by the Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP) for purchasing and using aquatic labeled pesticides. This status, however, could change and the pond owner should check with the WDATCP periodically for updating of the state and federal requirements on pesticides. These

requirements are entirely separate from the WDNR permit requirement under section 144.025 and NR 107 code.

(2) SCS Policy in Making Pesticide recommendations. Plant Science Memorandum-8 describes SCS policy and illustrates precautionary statements tht must accompany written recommendations.

(3) Making recommendations. Prudent use of approved chemicals can be an effective environmentally safe technique for controlling aquatic plants in fishponds. Two questions must be answered before making recommendations. First, what use is being made of the pond and pond water? Second, what plant or group of plants are to be controlled? These two questions greatly influence the selection of the chemical(s) to be used. Most herbicides recommended for water weed control carry complete instructions for their use on the container label. Special restrictions vary greatly among different chemicals. Recommendations shall always be made to READ THE ENTIRE LABEL BEFORE APPLYING. Remember a state permit from the WDNR is required for any control program.

Table 2
Influence of Overwinter Drawdown on Aquatic Plants*

A. Control by drawdown	
Swamp milkweed	*Asclepias incarnata*
Watershield	*Brasenia schreberi*
Coontail	*Certaophyllum demersum*
Spike Rush	*Eleocharis acicularis*
Milfoil	*Myriophyllum* spp.
Yellow water lily	*Nuphar* spp.
White water lily	*Nymphaea* spp.
Pickerelweed	*Pontedieria cordata*
Large-leaf pondweed	*Potamogeton amplifolius*
Robbin's pondweed	*P. robbinsi*
Marsh cinquefoil	*Potentilla palustris*
Stiff wapato	*Sagittaria heterophylla*
Bladderwort	*Utricularia* spp.
B. Little control by drawdown	
Sweet flag	*Acorus calamus*
Waterweed	*Anacharis*
Watershield	*Brasenia schreberi*
Coontail	*Ceratophylium demersum*
Spike rush	*Eleocharis acicularis*
Duckweed	*Lemna spp.*
	Potamogeton epihydrus
Floating-leaf pondweed	*Potamogeton natans*
Richardson's pondweed	*Potamogeton richardsonii*
Flat-stemmed pondweed	*Potamogeton zosteriformes*
Water crowfoot	*Ranunculus tricophyllus*
Arrowhead	*Sagittaria latifolia*
Three square bulrush	*Scirpus americanus*
	Sparaganium chlorocarpum
Big duckweed	*Spirodela polyrhiza*
Cattail	*Typha latifolia*
Bladderwort	*Utricularia vulgaris*
Wild celery	*Vallisneria americana*
C. Increase with drawdown	
Sweet flag	*Acorus calamus*
Manna grass	*Glyceria borealis*
Cut-grass	*Leersia oryzoides*
Bur marigold	*Megalodonta beckii*
Naiad	*Najas flexilis*
Marsh smartweed	*Polygonum coccineum*
Floating-leaf pondweed	*Potamogeton natans*
	Potamogeton diversifolium
	Potamogeton epihydrous
Leafy pondweed	*Potamogeton foliosus*
Variable pondweed	*Potamogeton gramineus*
Richardson's pondweed	*Potamogeton richardsonii*
Sand-bar willow	*Salix interior*
Softstem bulrush	*Scirpus validus*
Water parsnip	*Sium suave*
Cattail	*Typha latifolia*

* From Nichols, Stanley A. 1974. Mechanical and Habitat Manipulation for Aquatic Plant Management. Tech. Bull. No. 77. WI Dept. Nat. Res.

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